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On OCT 1, 2004

TOWNSEND and TOWNSEND and CREW LLP

By: 

Nicole Wartell



PATENT
Attorney Docket No.: A8313/T51200
AMAT No.: 008313
USA/DSM/HDP/CVD/JW
TTC No.: 016301-051200US

TFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

M. Ziaul Karim et al.

Application No.: 10/655,230

Filed: September 3, 2003

For: IN-SITU-ETCH-ASSISTED HDP
DEPOSITION USING SIF4, AND
HYDROGEN

Examiner: Unassigned

Art Unit: 1762

**SUPPLEMENTAL INFORMATION
DISCLOSURE STATEMENT UNDER 37
CFR §1.97 and §1.98**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The references cited on attached form PTO/SB/08A and PTO/SB/08B are being called to the attention of the Examiner. U.S. patents are not enclosed in accordance with the Patent Office waiver issued August 5, 2003 in the Official Gazette, which states as follows:

The Office hereby waives the requirement under 37 CFR 1.98 (a)(2)(i) for submitting a copy of each cited U.S. patent and each U.S. patent application publication for all U.S. national patent applications filed after June 30, 2003 and for all international applications that have entered the national stage under 35 USC 371 after June 30, 2003. See 37 CFR 1.491(b).

Applicants also wish to make the Examiner aware of the following co-pending patent applications:

1. U.S. Patent App. No. 10/915,781, filed August 10, 2004, Applicant Bibram Kapoor et al.;
2. U.S. Patent App. No. 10/446,531, filed May 27, 2003, Applicant M. Ziaul Karim et al.; and
3. U.S. Patent App. No. 10/847,922, filed May 18, 2004, Applicant Hemant P. Mungekar et al.

To comply with 37 CFR §1.98(a)(2)(iii), the specifications, drawings and claims for each of these applications are enclosed.

In accordance with 37 CFR 1.98(a)(2), copies of the foreign patents and non-patent literature references are enclosed. It is respectfully requested that the cited references be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

As provided for by 37 CFR 1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement. However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 20-1430. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,


Patrick M. Boucher
Reg. No. 44,037

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 303-571-4000, Fax: 303-571-4321
PMB:nmb
60315945 v1


**TRANSMITTAL
FORM**

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	10/655,230
Filing Date	September 3, 2003
First Named Inventor	M. Ziaul Karim
Art Unit	1762
Examiner Name	Unassigned
Total Number of Pages in This Submission	Attorney Docket Number A8313/T51200

ENCLOSURES (Check all that apply)

Fee Transmittal Form
 Fee Attached
 Amendment/Reply
 After Final
 Affidavits/declaration(s)
 Extension of Time Request
 Express Abandonment Request
 Information Disclosure Statement
 Certified Copy of Priority Document(s)
 Response to Missing Parts/ Incomplete Application
 Response to Missing Parts under 37 CFR 1.52 or 1.53

Drawing(s)
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 Petition
 Petition to Convert to a Provisional Application
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After Allowance Communication to Technology Center (TC)
 Appeal Communication to Board of Appeals and Interferences
 Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
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 Other Enclosure(s) (please identify below):
 Return Postcard, copies of three (3) cited pending applications, one (1) foreign Reference and twenty-one (21) cited Non-Patent Literature References

Remarks	The Commissioner is authorized to charge any additional fees to Deposit Account 20-1430.
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Townsend and Townsend and Crew LLP Patrick M. Boucher	Reg. No. 44,037
Signature		
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CERTIFICATE OF TRANSMISSION/MAILING

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Signature		Date October 1, 2004



Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Application Number	10/655,230
Sheet	1	of	4	Filing Date	September 3, 2003
				First Named Inventor	Karim, M. Ziaul
				Art Unit	1762
				Examiner Name	Unassigned
				Attorney Docket Number	A8313/T51200

U.S. PATENT DOCUMENTS*					
Examiner Initials*	Cite No. ¹	Document Number Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	US-4,572,841	02-25-1986	Kaganowicz et al.	
	A2	US-5,314,724	05-24-1994	Tsukune et al.	
	A3	US-5,507,881	04-16-1996	Sichanugrist et al.	
	A4	US-5,525,550	06-11-1996	Kato	
	A5	US-5,589,233	12-31-1996	Law et al.	
	A6	US-5,593,741	01-14-1997	Ikeda	
	A7	US-5,614,055	03-25-1997	Fairbairn et al.	
	A8	US-5,621,241	04-15-1997	Jain	
	A9	US-5,629,043	05-13-1997	Inaba et al.	
	A10	US-5,776,557	07-07-1998	Okano et al.	
	A11	US-5,786,039	07-28-1998	Brouquet	
	A12	US-5,807,785	09-15-1998	Ravi	
	A13	US-5,849,455	12-15-1998	Ueda et al.	
	A14	US-5,869,149	02-09-1999	Denison et al.	
	A15	US-5,874,350	02-23-1999	Nakagawa	
	A16	US-5,903,106	05-11-1999	Young et al.	
	A17	US-6,030,666	02-29-2000	Lam et al.	
	A18	US-6,042,901	03-28-2000	Denison et al.	
	A19	US-6,070,551	06-06-2000	Li et al.	
	A20	US-6,071,573	06-06-2000	Koemtzopoulos et al.	
	A21	US-6,074,959	06-13-2000	Wang et al.	
	A22	US-6,077,786	06-20-2000	Chakravarti et al.	
	A23	US-6,096,646	08-01-2000	Lee et al.	
	A24	US-6,106,678	08-22-2000	Shufflebotham et al.	
	A25	US-6,147,009	11-14-2000	Grill et al.	
	A26	US-6,149,976	11-21-2000	Matsuki et al.	
	A27	US-6,149,986	11-21-2000	Shibata et al.	
	A28	US-6,174,808 B1	01-16-2001	Jang et al.	
	A29	US-6,184,158 B1	02-06-2001	Shufflebotham et al.	
	A30	US-6,190,233 B1	02-20-2001	Hong et al.	
	A31	US-6,194,037 B1	02-27-2001	Terasaki et al.	
	A32	US-6,200,412 B1	03-13-2001	Kilgore et al.	
	A33	US-6,224,950 B1	05-01-2001	Hirata	
	A34	US-6,230,650 B1	05-15-2001	Yamazaki	
	A35	US-6,232,196 B1	05-15-2001	Raaijmakers et al.	
	A36	US-2001/0028924 A1	10-11-2001	Sherman	
	A37	US-2001/0033900 A1	10-25-2001	M'Saad et al.	
	A38	US-6,326,064 B1	12-04-2001	Denison et al.	
	A39	US-6,346,302 B2	02-12-2002	Kishimoto et al.	
	A40	US-6,372,291 B1	04-16-2002	Hua et al.	
	A41	US-6,416,823 B2	07-09-2002	Li et al.	

Examiner Signature		Date Considered	
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EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST-3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST-16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	10/655,230
(use as many sheets as necessary)				Filing Date	September 3, 2003
				First Named Inventor	Karim, M. Ziaul
				Art Unit	1762
				Examiner Name	Unassigned
Sheet	2	of	4	Attorney Docket Number	A8313/T51200

U.S. PATENT DOCUMENTS+					
Examiner Initials*	Cite No. ¹	Document Number Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A42	US-6,465,044 B1	10-15-2002	Jain et al.	
	A43	US-2002/0192396 A1	12-19-2002	Wang et al.	
	A44	US-6,531,193 B2	03-11-2003	Fonash et al.	
	A45	US-6,537,929 B1	03-25-2003	Cheung et al.	
	A46	US-2003/0056900 A1	03-27-2003	Li et al.	
	A47	US-6,559,026 B1	05-06-2003	Roszman et al.	
	A48	US-6,589,610 B2	07-08-2003	Li et al.	
	A49	US-6,589,611 B1	07-08-2003	Li et al.	
	A50	US-6,596,653 B2	07-22-2003	Tan et al.	
	A51	US-6,607,983 B1	08-19-2003	Chun et al.	
	A52	US-2003/0159656 A1	08-28-2003	Zhengquan Tan et al.	
	A53	US-6,626,188 B1	09-30-2003	Fitzsimmons et al.	
	A54	US 2003-0203637 A1	10-30-2003	Zhong Qiang Hua et al.	
	A55	US-6,653,203 B1	11-25-2003	Huang et al.	
	A56	US-2003/0219540 A1	11-27-2003	Law et al.	
	A57	US-6,673,722 B1	01-06-2004	Yamazaki	
	A58	US-6,713,390 B2	03-30-2004	M'Saad et al.	
	A59	US 2004-0146661 A1	07-29-2004	Kapoor, Bikram et al.	

FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ Number ⁴ Kind Code ⁵ (if known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	B1	EP	0 883 166	A2	09-12-1998
	B2				

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT					
<i>(use as many sheets as necessary)</i>					
Sheet	3	of	4		
				Application Number	10/655,230
				Filing Date	September 3, 2003
				First Named Inventor	Karim, M. Ziaul
				Art Unit	1762
				Examiner Name	Unassigned
				Attorney Docket Number	A8313/T51200

NON PATENT LITERATURE DOCUMENTS				
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		T ²
	C1	Alonso, J.C. et al., "High rate-low temperature deposition of silicon dioxide films..." JVST A 13(6) Nov/Dec 1995, pp. 2924-2929.		
	C2	Bar-Ilan et al., "A comparative study of sub-micron gap filling and planarization techniques", SPIE vol 2636, October 1995, . 277-288.		
	C3	Broomfield et al., "HDP Dielectric BEOL Gapfill: A Process for Manufacturing", IEEE/SEMI Advanced Semiconductor Manufacturing Conference 1996, pp. 255-258.		
	C4	Conti et al., "Processing methods to fill High aspect ratio gaps without premature constriction," DUMIC Conference, Feb. 8-9,1999, pp. 201-209.		
	C5	Horike et al., "High rate and highly selective SiO ₂ etching employing inductively coupled plasma and discussion on reaction kinetics", JVST A 13(3) May/Jun 1995, pp. 801-809.		
	C6	Kuo et al., "Thick SiO ₂ films obtained by plasma-enhanced chemical vapor deposition using hexamethyldisilazane, Carbon dioxide and hydrogen", Journal of The Electrochemical Society, 147 (7) 2000 p. 2679-2684.		
	C7	Lee et al., "Low Temperature Silicon Nitride and silicon Dioxide Film..." JECS; 147 (4) 2000, pp. 1481-1486.		
	C8	Lim et al., "Gap-fill Performance and Film properties of PMD Films for the 65 nm device Technology", IEEE International Symposium on Semiconductor Manufacturing, Sept 30-Oct. 2, 2003, p.435-438.		
	C9	MEEKS et al., "Modeling of SiO ₂ deposition in high density plasma reactors and comparisons of model predictions with experimental measurements," J. Vac. Sci. Technol. A, 16(2):544-563 (1998).		
	C10	Nag et al., "Comparative Evaluation of gap- fill dielectrics in shallow trench isolation for sub-0.25 micron Technologies" IEDM 1996, . 841-844.		
	C11	Pai, "High quality voids free oxide deposition", Materials Chemistry and Physics, 44, 1996, pp. 1-8.		
	C12	Pankov et al., "The effect of hydrogen addition on the fluorine doping level of SiO ₂ films prepared by remote plasma enhanced chemical vapor deposition using SiF ₄ -based plasmas", Japanese Journal of Applied Physics part 1,37 (11) November 1998, pp. 6135-6141.		
	C13	Peters, "Choices and challenges for shallow trench isolation", Semiconductor International, April 1999, pp. 69-76.		
	C14	Takahashi et al., "The Effect of Gas-phase additives C ₂ H ₄ , C ₂ H ₆ and C ₂ H ₂ on SiH ₄ /O ₂ chemical vapor deposition". Journal of the Electrochemical Society, 143 (4) April 1996, pp. 1355-1361.		
	C15	Takeishi et al., "Fluorocarbon films deposited by PECVD with..." DUMIC 1996, pp. 71-77.		

Examiner Signature	Date Considered
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<i>(use as many sheets as necessary)</i>					
Sheet	4	of	4		
				Attorney Docket Number	A8313/T51200

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
	C16	Vassiliev et al., "Properties and Gap-Fill Capability of HPD-CVD Phosphosilicate Glass Films for Subquarter-Micrometer ULSI Device Technology" <i>Electrochemical and Solid-State Letters</i> 3 (2), 2000, pp. 80-83.	<input type="checkbox"/> ²
	C17	Vassiliev, "Void-free pre-metal dielectric gap- fill capability with CVD films for subquarter-micron ULSI" <i>DUMIC</i> , Feb. 28-29,2000, pp. 121-132.	<input type="checkbox"/>
	C18	Xia et al., "High aspect ratio trench filling sing two-step..." <i>JECS</i> , 146 (5),1999, p. 1884-1888.	<input type="checkbox"/>
	C19	Xia et al., "High Temperature Subatmospheric Chemical Vapor Deposited Undoped Silicate Glass," <i>JECS</i> 146 (3) 1999, pp. 1181-1185.	<input type="checkbox"/>
	C20	Yota et al., "Advanced passivation layer using high-density plasma CVD oxide for 0.25 micron CMOS Technology" <i>DUMIC</i> , Feb 16-17, 1998,pp. 185-192.	<input type="checkbox"/>
	C21	Yota et al., "Extendibility of ICP high-density plasma CVD for use as intermetal dielectric and passivation layers for 0.18 micron technology," <i>DUMIC</i> Feb. 8-9, 1999, pp. 71-82.	<input type="checkbox"/>
	C22		<input type="checkbox"/>

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